

CLAIMS

1. A method of determining face sub-spaces, the method comprising:
 - a. generating a first series of initial images in which a first predetermined facial property is modified,
 - b. generating a second series of initial images in which a second predetermined facial property is modified,
 - c. coding each series of images according to the variance of the images to obtain an estimated sub-space for each facial property,
 - d. concatenating the sub-spaces to provide a single over-exhaustive space,
 - e. approximating each image of the first and second series on the over-exhaustive space to obtain approximated versions of each image on each estimated property subspace,
 - f. generating overall approximated versions of each image on the whole over-exhaustive space,
 - g. comparing the overall approximated version of each image with the initial image to determine an error value for each image,
 - h. sub-dividing the error value for each image into a sub-error for each estimated property sub-space in proportion to the variance of that sub-space,
 - i. combining each sub-error for each image with the approximated version of that image on the estimated property sub-space, to obtain a new approximated version in the property sub-space for each image,
 - j. coding the new approximated versions of the images according to their variance to obtain new estimated sub-spaces.
2. A method of determining face sub-spaces according to claim 1, further comprising approximating each image on the new estimated sub-spaces as described in steps 'a' to 'j' and then repeating steps 'd' to 'j' until the sub-spaces have stabilised.

Sub A1
3. A method of determining face sub-spaces according to claim 1 or claim 2, wherein three or more series of images are generated, a different predetermined facial property being modified in each series.

4. A method according to claim 3, wherein the predetermined facial properties are categorised as at least some of identity, expression, pose, lighting and age.

Sub A2
5. A method according to any of claims 1 to 4, wherein at least one further series of images is generated, a further predetermined facial property being modified in the series.

6. A method of determining face sub-spaces, the method comprising making initial estimates of the sub-spaces, for example lighting, pose, identity and expression, using Principle Component Analysis on appropriate groups of faces, applying an iterative algorithm to image codings to maximise the probability of coding across these non-orthogonal sub-spaces, obtaining the projection on each sub-space, and recalculating the spaces.

7. A method of determining face sub-spaces substantially as hereinbefore described.